YAMAHA

SERVICE MANUAL

PZ50W
PZ50GTW
PZ50FXW
PZ50MW
PZ50VTW
PZ50MPW

LIT-12618-02-58

8GC-28197-10

NOTICE

This manual was written by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to put an entire mechanic's education into one manual, so it is assumed that persons using this book to perform maintenance and repairs on Yamaha snowmobiles have a basic understanding of the mechanical concepts and procedures inherent in snowmobile repair. Without such knowledge, attempted repairs or service to this model may render it unfit and/or unsafe to use. Yamaha Motor Company, Ltd. is continually striving to improve all models manufactured by Yamaha. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will, where applicable, appear in future editions of this manual.

PZ50W, PZ50GTW, PZ50FXW, PZ50MW, PZ50VTW, PZ50MPW
SERVICE MANUAL

1st Edition, July 2006

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P/N.LIT-12618-02-58

HOW TO USE THIS MANUAL

Particularly important information is distinguished in this manual by the following notations:

⚠

The Safety Alert Symbol means ATTENTION! BE ALERT! YOUR SAFETY IS INVOLVED!

⚠ WARNING

Failure to follow WARNING instructions could result in severe injury or death to the snowmobile operator, a bystander, or a person inspecting or repairing the snowmobile.

CAUTION:

A CAUTION indicates special precautions that must be taken to avoid damage to the snowmobile.

NOTE:

A NOTE provides key information that can make procedures easier or clearer.

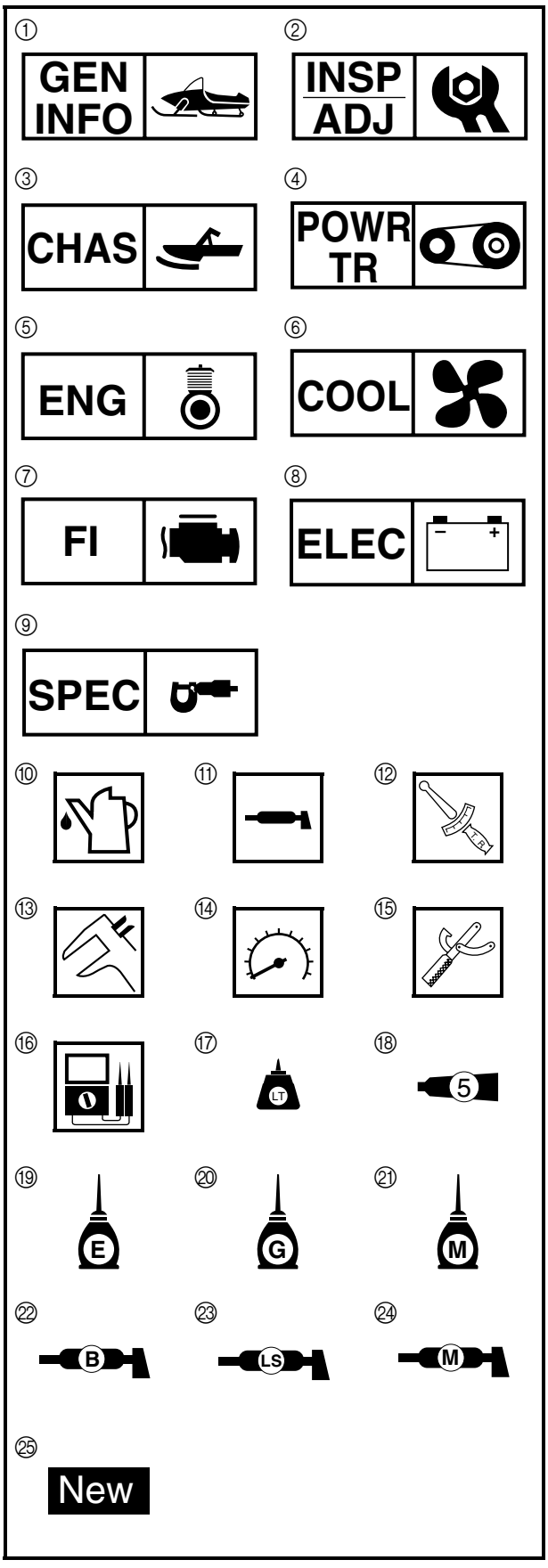
MANUAL FORMAT

All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all inspection, repair, assembly, and disassembly operations.
In this revised format, the condition of a faulty component will precede an arrow symbol and the course of action required to correct the problem will follow the symbol, e.g.,

- Bearings
  Pitting/damage → Replace.

EXPLODED DIAGRAM

Each chapter provides exploded diagrams before each disassembly section to facilitate correct disassembly and assembly procedures.



ILLUSTRATED SYMBOLS (Refer to the illustration)

Illustrated symbols ① to ⑨ are designed as thumb tabs to indicate the chapter's number and content.

① General information
② Periodic inspection and adjustment
③ Chassis
④ Power train
⑤ Engine
⑥ Cooling system
⑦ Fuel injection system
⑧ Electrical
⑨ Specifications

Illustrated symbols ⑩ to ⑯ are used to identify the specifications which appear.

⑩ Filling fluid
⑪ Lubricant
⑫ Tightening
⑬ Wear limit, clearance
⑭ Engine speed
⑮ Special tool
⑯ Ω, V, A

Illustrated symbols ⑰ to ㉕ in the exploded diagram indicate grade of lubricant and location of lubrication point.

⑰ Apply locking agent (LOCTITE®)
⑱ Apply Yamabond No.5®
⑲ Apply engine oil
⑳ Apply gear oil
㉑ Apply molybdenum disulfide oil
㉒ Apply wheel bearing grease
㉓ Apply low-temperature lithium-soap base grease
㉔ Apply molybdenum disulfide grease
㉕ Use new one

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CHASSIS

CHAPTER 4. POWER TRAIN

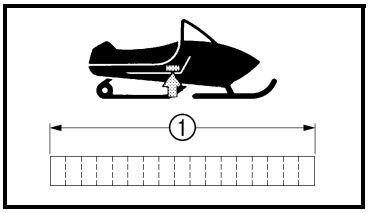
CHAPTER 5. ENGINE

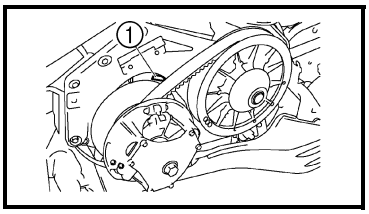
CHAPTER 6. COOLING SYSTEM

CHAPTER 7. FUEL INJECTION SYSTEM

CHAPTER 8. ELECTRICAL

CHAPTER 9. SPECIFICATIONS





GENERAL INFORMATION

MACHINE IDENTIFICATION

FRAME SERIAL NUMBER

The frame serial number ① is located on the right-hand side of the frame (just below the front of the seat).

ENGINE SERIAL NUMBER

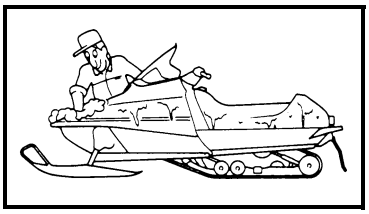
The engine serial number ① is located on the left-hand side of the crankcase.

NOTE:

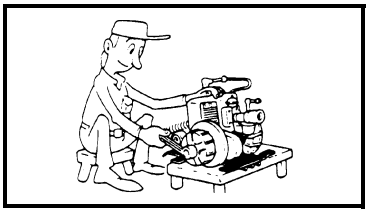
Designs and specifications are subject to change without notice.

IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY



1. Remove all dirt, mud, dust, and foreign material before removal and disassembly.
   While cleaning, take care to protect the electrical parts, such as relays, switches, motor, resistors, controllers, etc., from high pressure water splashes.

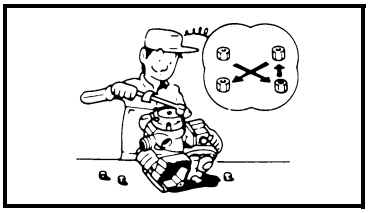


2. Use proper tools and cleaning equipment.
   Refer to “SPECIAL TOOLS”.

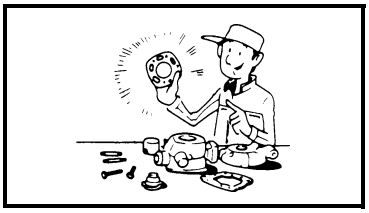
3. When disassembling the machine, keep mated parts together. This includes gears, cylinders, pistons, and other parts that have been “mated” through normal wear. Mated parts must be reused or replaced as an assembly.

4. During disassembly of the machine, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help ensure that all parts are reinstalled correctly.

5. Keep all parts away from any source of fire.



6. Be sure to keep to the tightening torque specifications. When tightening bolts, nuts, and screws, start with those that have larger diameters, and proceed from the inside to the outside in a crisscross pattern.

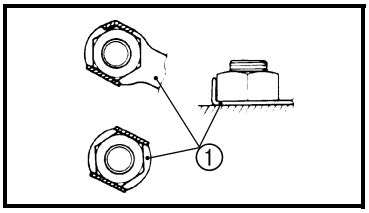


ALL REPLACEMENT PARTS

We recommend using genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for assembly and adjustments.

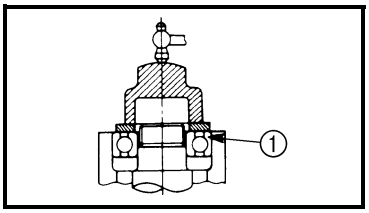
GASKETS, OIL SEALS, AND O-RINGS

1. All gaskets, seals, and O-rings should be replaced when an engine is overhauled. All gasket surfaces, oil seal lips, and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.



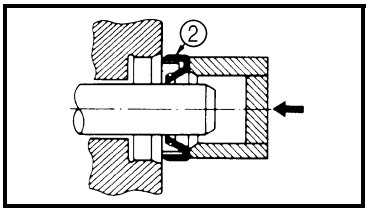
LOCK WASHERS/PLATES AND COTTER PINS

All lock washers/plates ① and cotter pins must be replaced if they are removed. Lock tab(s) should be bent along the bolt or nut flat(s) after the bolt or nut has been properly tightened.



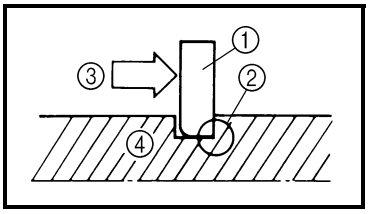
BEARINGS AND OIL SEALS

Install the bearings ① and oil seals ② with their manufacturer's marks or numbers facing outwards. (In other words, the stamped letters must be on the side exposed to view.) When installing oil seals, apply a light coating of lightweight lithium base grease to the seal lips. Oil the bearings liberally when installing.



CAUTION:

Do not use compressed air to spin the bearings dry. This causes damage to the surface of the bearings.



CIRCLIPS

All circlips should be inspected carefully before reassembly. Always replace piston pin clips after one use. Replace misshapen circlips. When installing a circlip ①, make sure that the sharp edged corner ② is positioned opposite to the thrust ③ it receives. See the sectional view.

④ Shaft

LOCTITE®

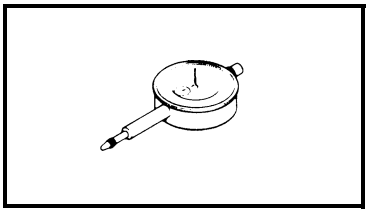
After installing fasteners that have LOCTITE® applied, wait 24 hours before using the machine. This will give the LOCTITE® time to dry properly.

SPECIAL TOOLS

Some special tools are necessary for a completely accurate tune-up and assembly. Using the correct special tool will help prevent damage that can be caused by the use of improper tools or improvised techniques.

NOTE:

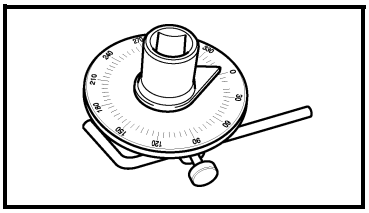
- Be sure to use the correct part number when ordering the tool, since the part number may differ according to country.
- For USA and Canada, use part number starting with “YB-”, “YM-”, “YU-” or “YS-”.
- For others, use part number starting with “90890-”.



FOR TUNE UP

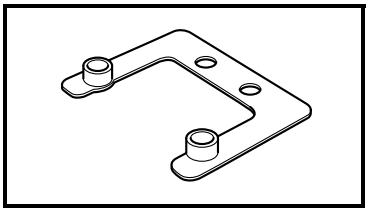
- Dial gauge
  P/N: YU-03097
  90890-03097

This gauge is used for run out measurement.



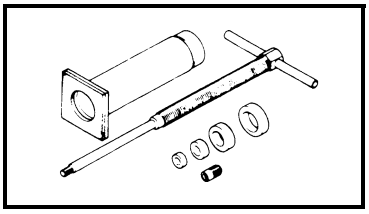
- Angle gauge
  Use goods on the market.

This tool is used to tightening the torque.



- Steering linkage alignment plate
  P/N: YS-01515
  90890-01515

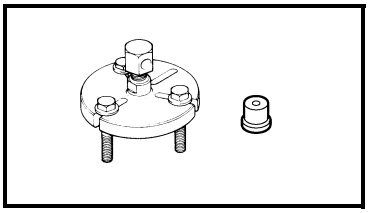
Locks steering relay arm and pivot arm shaft in place while adjusting the steering linkage for front-end alignment.



FOR ENGINE SERVICE

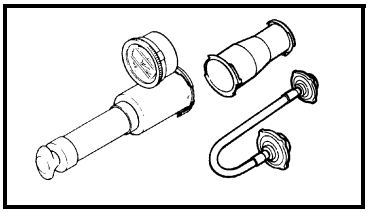
- Piston pin puller
  P/N: YU-01304
  90890-01304

This tool is used to remove the piston pin.



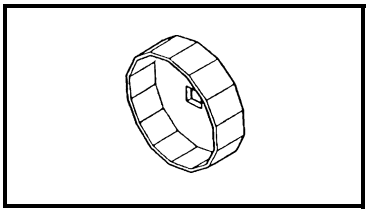
- Rotor holding puller
  P/N: YU-33270-B
  90890-01362
- Flywheel puller attachment
  P/N: YM-33282
  90890-04089

These tools are used to remove the magneto rotor.



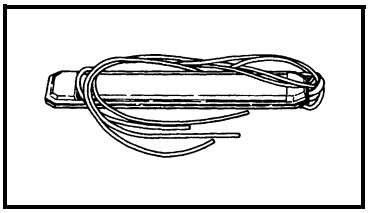
- Cooling system tester
  P/N: YU-24460-01
  90890-01325
- Adapter
  P/N: YU-33984
  90890-01352

This tester and its adapter are used for checking the cooling system.



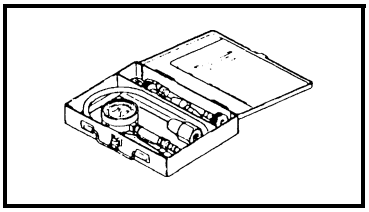
- Oil filter wrench
  P/N: YM-01469
  90890-01469

This tool is needed to loosen or tighten the oil filter cartridge.



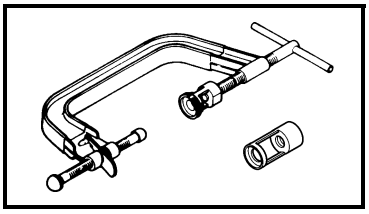
- Vacuum gauge
  P/N: YU-44456
  90890-03094

This guide is used to synchronize the carburetors.



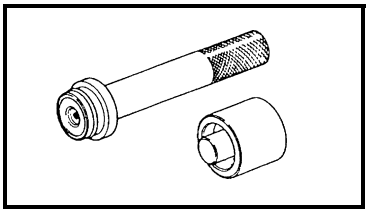
- Compression gauge
  P/N: YU-33223 (compression gage)
  90890-03081

These tools are used to measure engine compression.



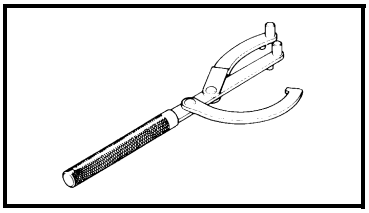
- Valve spring compressor
  P/N: YM-04019
  90890-04019
- Valve spring compressor attachment
  P/N: YM-04108
  90890-04108
  P/N: YM-04114
  90890-04114

These tools are used to remove or install the valve assemblies.



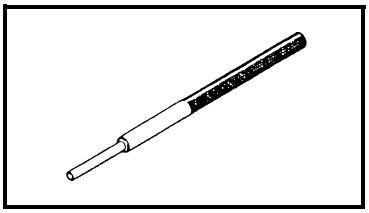
- 40 and 50 mm bearing driver
  P/N: YM-04058
  90890-04058
- Mechanical seal installer
  P/N: YM-04145
  90890-04145

These tools are used to install the water pump seal.



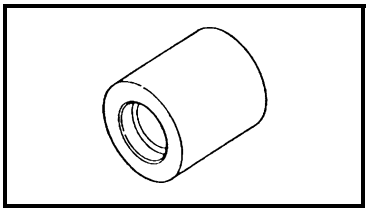
- Rotor holding tool
  P/N: YU-01235
  90890-01235

This tool is used to hold the camshaft sprocket.



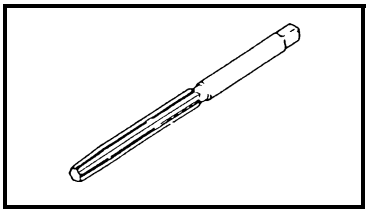
- Valve guide remover (ø4)
  P/N: YM-04111
  90890-04111

This tool is used to remove or install the valve guides.



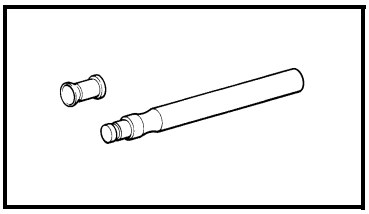
- Valve guide installer (ø4)
  P/N: YM-04112
  90890-04112

This tool is used to install the valve guides.



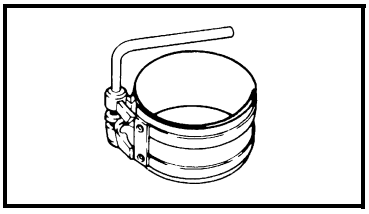
- Valve guide reamer (ø4)
  P/N: YM-04113
  90890-04113

This tool is used to rebore the new valve guides.



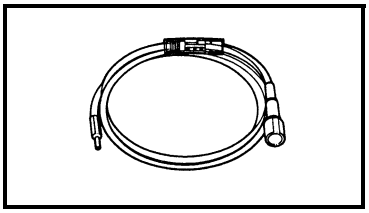
- Valve lapper
  P/N: 90890-04101

This tool is needed to remove and install the valve lifters.



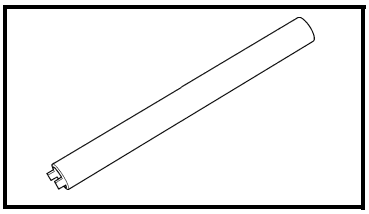
- Piston ring compressor
  P/N: YM-08037
  90890-05158

This tool is used to compress the piston rings when installing the piston into the cylinder.



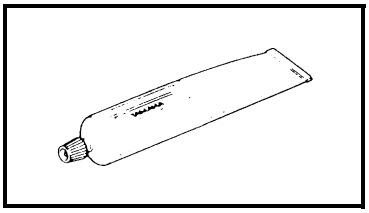
- Dynamic spark tester
  P/N: YM-34487
- Ignition checker
  P/N: 90890-06754

This tool is used to check the ignition system component.



- Engine mount spacer wrench
  P/N: YS-01516
  90890-01516

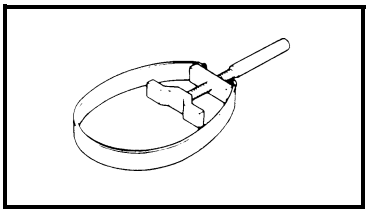
Used to turn the engine mounting bolts when removing/installing engine.



- Yamaha bond No. 1215
  P/N: 90890-85505
  (Three Bond No.1215®)

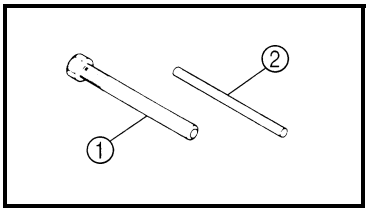
This bond is used to seal two mating surfaces (e.g., crankcase mating surfaces.)

FOR POWER TRAIN SERVICE



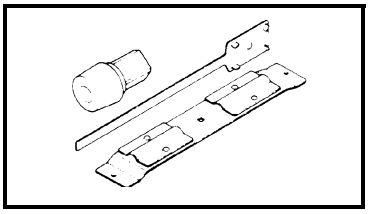
- Sheave holder
  P/N: YS-01880-A
  90890-01701

This tool is used to hold the primary sheave and A.C. magneto rotor.



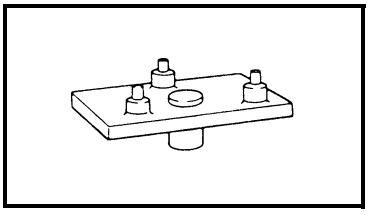
- Primary sheave puller (18 mm)
  P/N: YS-01881-A ①, YS-01881-1 ②
  90890-01898

This tool is used for removing the primary sheave.



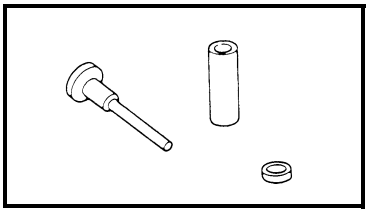
- Clutch spider separator
  P/N: YS-28890-C
  90890-01711

This tool is used when disassembling and assembling the primary sheave.



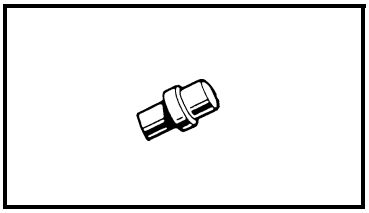
- Clutch separator adapter
  P/N: YS-34480
  90890-01740

This tool is used when disassembling and assembling the primary sheave.



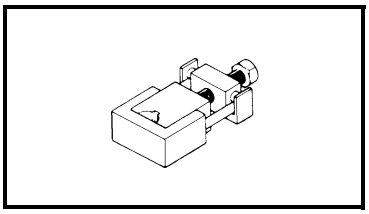
- YXR clutch bushing jig kit
  P/N: YS-39752

This tool is used for removal and installation of primary clutch weight and roller bushings.



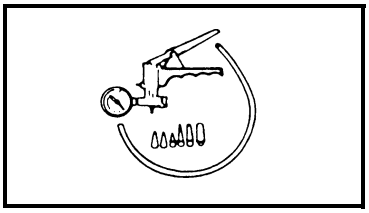
- Clutch bushing press
  P/N: YS-42424

This tool is used for removing and installing the post bushings (primary sheave cap bush, sliding sheave bush and torque cam bush).



- Track clip installer
  P/N: YS-91045-C
  90890-01721

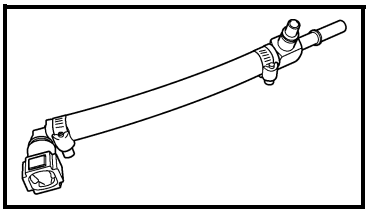
This tool is used for installing the track clip.



FOR FUEL INJECTION SERVICE

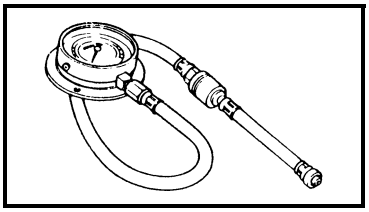
- Mity vac
  P/N: YS-42423
  90890-06756

This tool is used to measure the vacuum pressure.



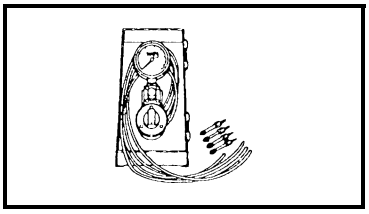
- Fuel pressure adapter
  P/N: YM-03176
  90890-03176

This tool is needed to measure fuel pressure.



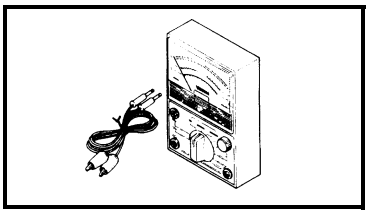
- Pressure gauge
  P/N: YU-03153
  90890-03153

This tool is used to measure fuel pressure.



- Vacuum gauge
  P/N: YU-08030
  90890-03094

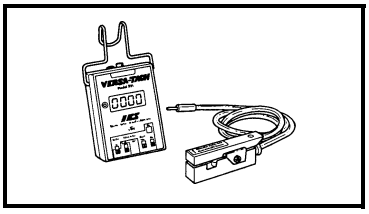
This guide is used to synchronize the throttle bodies.



FOR ELECTRICAL SERVICE

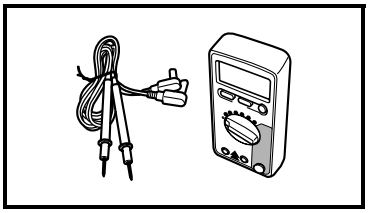
- Pocket tester
  P/N: YU-03112-C
  90890-03112

This instrument is necessary for checking the electrical components.



- Engine tachometer
  P/N: YU-08036-C
  90793-80009

This tool is used to check engine speed.



- Digital circuit tester
  P/N: YU-A1927
  90890-03174

This instrument is necessary for checking the electrical componenets.

PERIODIC INSPECTION AND ADJUSTMENT

INTRODUCTION

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable machine operation and a longer service life. In addition, the need for costly overhaul work will be greatly reduced. This information applies to machines already in service as well as new machines that are being prepared for sale. All service technicians should be familiar with this entire chapter.

PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

Item	Remarks	Pre-operation check (Daily)	Initial 1 month or 800 km (500 mi) (40 hr)	Every Seasonally or 4,000 km (2,500 mi) (200 hr)
Spark plugs	Check condition. Adjust gap and clean. Replace if necessary.			●
* Valve clearance	Check clearance. Adjust clearance when engine is cold.	Every 40,000 km (25,000 mi)		
* Crankcase breather system	Check breather hose for cracks or damage. Replace if necessary.			●
* Fuel filter	Check condition. Replace if necessary.			●
* Fuel line	Check fuel hose for cracks or damage. Replace if necessary.			●
* Idle speed	Check and adjust engine idle speed.		●	●
* Fuel injection	Adjust synchronization.		●	●
* Exhaust system	Check for leakage. Tighten or replace gasket if necessary.			●

* It is recommended that these items be serviced by a Yamaha dealer.

GENERAL MAINTENANCE AND LUBRICATION CHART

Item	Remarks	Pre-operation check (Daily)	Initial 1 month or 800 km (500 mi) (40 hr)	Every Seasonally or 4,000 km (2,500 mi) (200 hr)
Engine oil	Check oil level.	●		
	* Replace.		●	●
* Engine oil filter cartridge	Replace.		●	Every 20,000 km (12,000 mi)
Fuel	Check fuel level.	●		
Engine coolant	Check coolant level.	●		
	* Air bleed the cooling system if necessary.			●
Throttle lever (handlebar side)	Check operation. * Repair if necessary.	●		
Throttle override system (T.O.R.S.)	Check operation. * Repair if necessary.	●		
Engine stop switch	Check operation. * Repair if necessary.	●		
Drive guard	Check for cracks, bends or damage. * Replace if necessary.	●		
V-belt	Check for wear and damage. Replace if necessary.	●		
Drive track and idler wheels	Check deflection, and for wear and damage. * Adjust/replace if necessary.	●		
Slide runners	Check for wear and damage.	●		
	* Replace if necessary.			●
Brake and parking brake	Check operation and fluid leakage.	●		
	* Adjust free play and/or replace pads if necessary.			●
	* Replace brake fluid.	See NOTE on page 2-3.		
* Disc brake installation	Check for slight free play. Lubricate shaft with specified grease as required.			Every 1,600 km (1,000 mi)
Drive chain oil	Check oil level.		●	
	* Replace.			●
Drive chain	Check deflection. * Adjust if necessary.	Initial at 500 km (300 mi) and every 800 km (500 mi) thereafter.		
Skis and ski runners	Check for wear and damage.	●		
	* Replace if necessary.			●
Steering system	Check operation.	●		
	* Adjust toe-out if necessary.			●
Strap (PZ50M)	Check for damage. * Replace if necessary.	●		
Lights	Check operation. Replace bulbs if necessary.	●		
* Battery	Check condition. Charge if necessary.			●
* Primary and secondary clutches	Check engagement and shift speed. Adjust if necessary.			●
		Whenever operating elevation is changed.		
	Inspect sheaves for wear/damage. Inspect weights/rollers and bushings for wear-for primary. Inspect ramp shoes/bushings for wear-for secondary. Replace if necessary.			●
	Lubricate with specified grease.			●
* Steering column bearing	Lubricate with specified grease.			●
* Ski and front suspension	Lubricate with specified grease.			●

* It is recommended that these items be serviced by a Yamaha dealer.

GENERAL MAINTENANCE AND LUBRICATION CHART

INSP ADJ

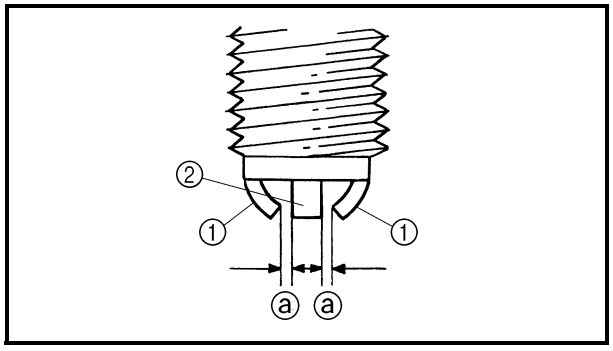
Item	Remarks	Pre-operation check (Daily)	Initial 1 month or 800 km (500 mi) (40 hr)	Every Seasonally or 4,000 km (2,500 mi) (200 hr)
* Suspension component	Lubricate with specified grease.			●
* Parking brake cable end and lever end/throttle cable end	Lubricate with specified grease.			●
	Check cable damage. Replace if necessary.			●
Shroud and covers	Make sure that the shroud and covers are securely fastened.	●		
Fittings and fasteners	Check tightness. * Repair if necessary.	●		
Tool kit and recommended equipment	Check for proper placement.	●		

* It is recommended that these items be serviced by a Yamaha dealer.

NOTE:

Brake system:

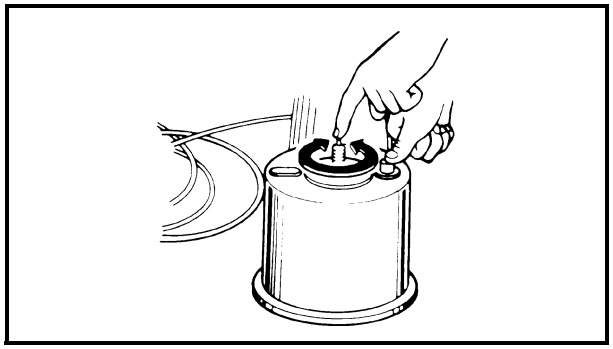
- After disassembling the master cylinder or caliper cylinder, always change the brake fluid. Regularly check the brake fluid level and add fluid if necessary.
- Replace the oil seals of the master cylinder and caliper cylinder every two years.
- Replace the brake hose every four years, or if cracked or damaged.



ENGINE

SPARK PLUGS

1. Remove:
   - Fuel tank
     Refer to “SEAT AND FUEL TANK” in CHAPTER 5. (PZ50/PZ50GT/PZ50FX/PZ50M)
     Refer to “RIDER SEAT AND FUEL TANK” in CHAPTER 5. (PZ50VT/PZ50MP)
2. Remove:
   - Spark plug caps
   - Spark plugs
3. Inspect:
   - Electrodes ①
     Damage/wear → Replace the spark plug.
   - Insulator color ②
     Abnormal color → Replace the spark plug
     Normal color is medium-to-light tan.
4. Measure:
   - Spark plug gap ⓐ
     Out of specification → Regap.
     Use a wire thickness gauge.



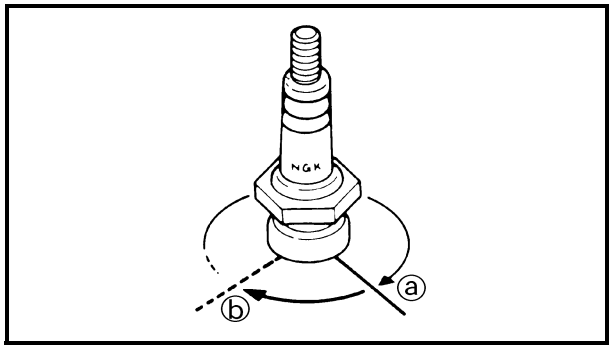
Spark plug gap:
0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

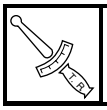
If necessary, clean the spark plugs with a spark plug cleaner.

Standard spark plug:
NGK R CR9EKB (NGK)

Before installing a spark plug, clean the gasket surface and spark plug surface.

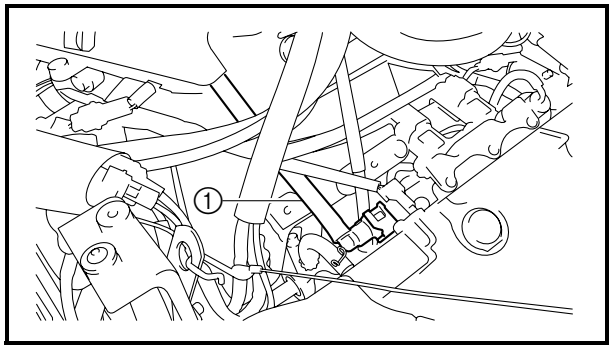
5. Install:
   - Spark plugs





Spark plug:
13 Nm (1.3 m · kg, 9.4 ft · lb)

NOTE:
Finger-tighten ⓐ the spark plug before torquing ⓑ it to specification.



FUEL LINE INSPECTION

1. Remove:
   - Headlight assembly (PZ50/PZ50GT/PZ50FX/PZ50M)
     Refer to “COWLINGS” in CHAPTER 3.
2. Inspect:
   - Fuel hose ①
   - Fuel return hose
     Cracks/damage → Replace.

COOLING SYSTEM

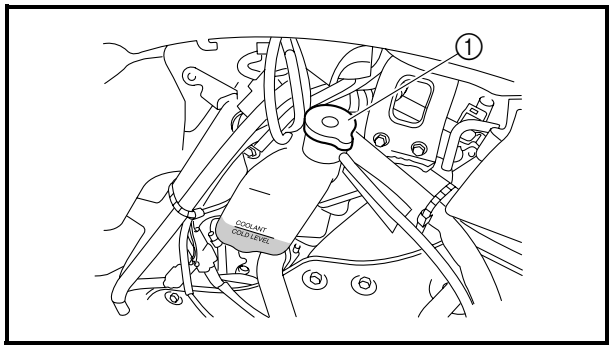
Coolant replacement

NOTE:

The coolant should be changed at least every season.

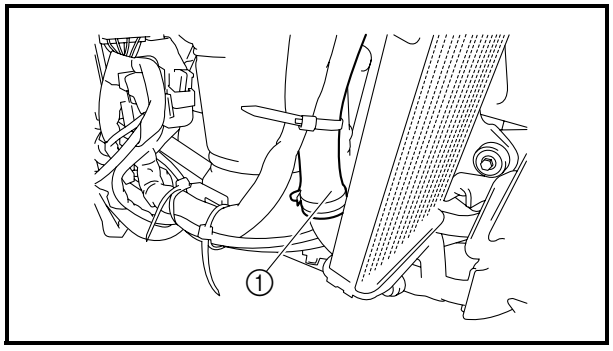
1. Place the machine on a level surface.
2. Remove:
   - Right side panel
   - Right side cover

   Refer to "COWLINGS" in CHAPTER 3.
3. Remove:
   - Coolant filler cap ①



⚠ WARNING

Do not remove the coolant filler cap ① when the engine is hot. Pressurized scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, place a thick rag or a towel over the coolant filler cap. Slowly turn the cap counterclockwise until it stop. This allows any residual pressure to escape. When the hissing sound has stopped, press down on the cap while turning it counterclockwise to remove it.



4. Place an open container under the radiator outlet hose 1.
5. Disconnect:
   - Radiator outlet hose 1 ①
6. Drain the coolant.

NOTE:

Lift up the tail of the machine to drain the coolant.

⚠ WARNING

Coolant is poisonous. It is harmful or fatal if swallowed.

- **If coolant is swallowed, induce vomiting immediately and get immediate medical attention.**
- **If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.**
- **If coolant splashes on your skin or clothes, quickly wash it away with soap and water.**

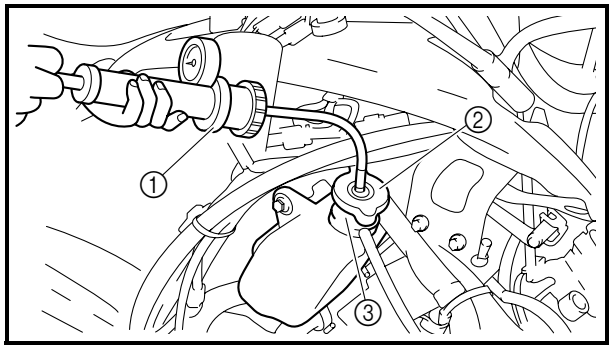
7. Connect:
   • Radiator outlet hose 1
8. Fill:
   • Cooling system

Recommended coolant:
High quality silicate-free ethylene glycol antifreeze containing corrosion inhibitors
Coolant mixing ratio (coolant:water):
3:2 (60%:40%)
Total amount:
PZ50/PZ50GT/PZ50FX/PZ50M
3.6 L (3.17 Imp qt, 3.81 US qt)
PZ50VT/PZ50MP
3.7 L (3.26 Imp qt, 3.91 US qt)

CAUTION:

- **Hard water or salt water is harmful to engine parts. If soft water is not available, use boiled or distilled water.**
- **Do not use water containing impurities or oil.**

9. Bleed the air from the cooling system.



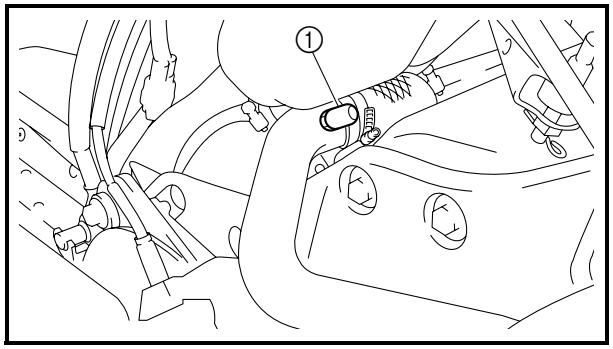
10. Inspect:
    • Cooling system
      Decrease of pressure (leaks) → Repair as required.

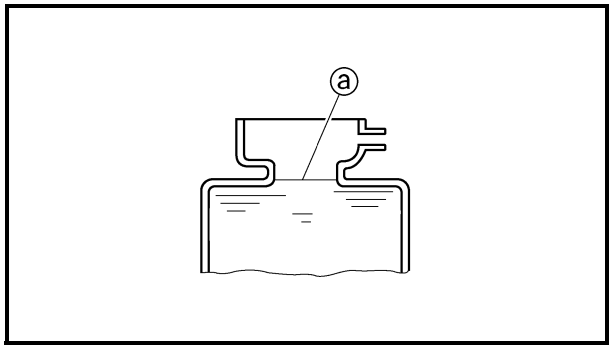
Inspection steps:

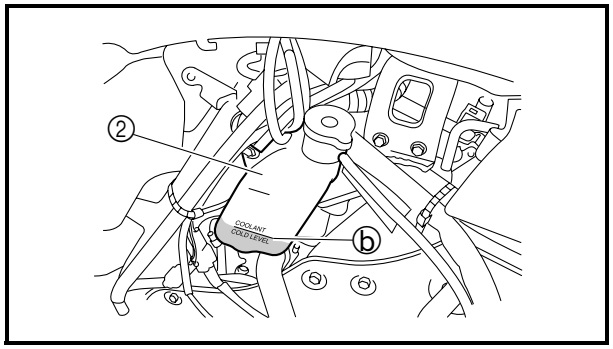
- Attach the cooling system tester ① and adapter ② to the coolant filler ③.

Cooling system tester:
90890-01325, YU-24460-01
Adapter:
90890-01352, YU-33984

- Apply 100 kPa (1.0 kg/cm^2, 14 psi).
- Measure the pressure with the gauge.







Air bleeding steps:

- Remove the cap ① on the radiator outlet pipe 1.
- While slowly adding coolant to the coolant filler, drain the coolant until no more air bubbles appear.
- Install the cap ①.
- Add coolant to the full level ⓐ.
- Install the coolant filler cap.

  Apply and lock the parking brake. Start the engine and run it at approximately 1,700 ~ 3,500 r/min until the coolant circulates (approximately 3 ~ 5 minutes). The heat exchanger will be warm to the touch.

⚠ WARNING

To avoid severe injury or death:

- **Make sure the machine is securely supported with a suitable stand.**
- **Do not exceed 3,500 r/min. Drive line damage and excessive V-belt wear could occur, or the machine could unexpectedly move forward if the clutch engages.**
- **Operate the engine only in a well-ventilated area.**

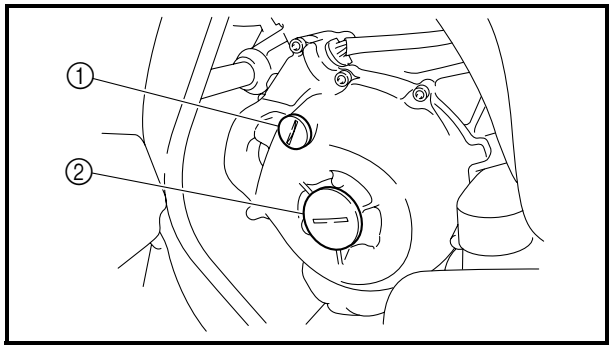
- Remove the coolant filler cap and bleed the cooling system again, as described above.
  No air bubbles → OK.
- Pour coolant into the coolant reservoir ② until the coolant level reaches the “COLD LEVEL” mark ⓑ.

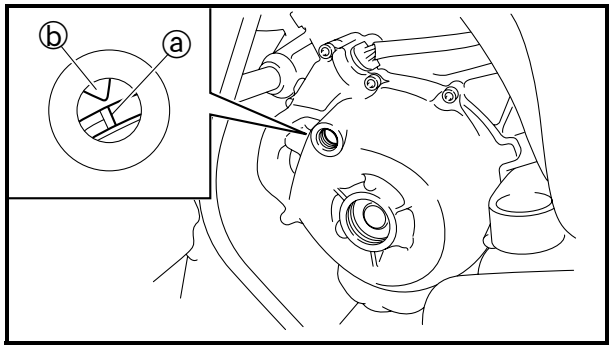
VALVE CLEARANCE ADJUSTMENT

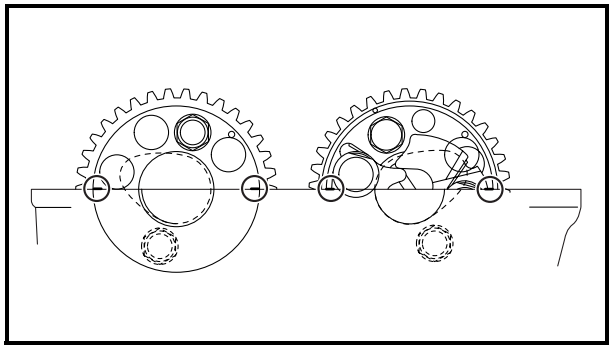
NOTE:

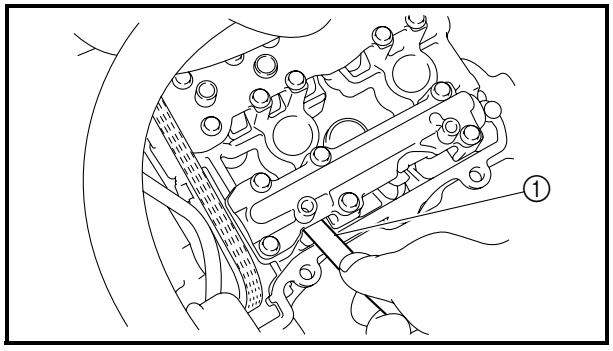
- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at the top dead center (TDC) on the compression stroke.

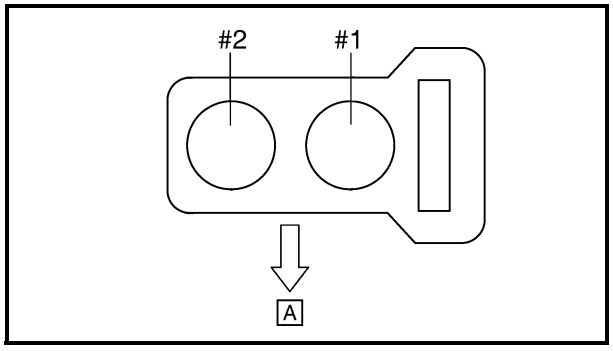
1. Drain:
   - Engine oil
     Refer to “ENGINE OIL REPLACEMENT”.
2. Remove:
   - Fuel tank
     Refer to “SEAT AND FUEL TANK” in CHAPTER 5. (PZ50/PZ50GT/PZ50FX/PZ50M)
     Refer to “RIDER SEAT AND FUEL TANK” in CHAPTER 5. (PZ50VT/PZ50MP)
   - Oil tank
     Refer to “A.C. MAGNETO ROTOR AND STARTER CLUTCH” in CHAPTER 5.











3. Remove:
   - Cylinder head cover
     Refer to “CAMSHAFTS” in CHAPTER 5.
   - Timing mark accessing screw ①
   - Crankshaft end accessing screw ②
4. Measure:
   - Valve clearance
     Out of specification → Adjust.

Valve clearance (cold):
Intake valve:
0.11 ~ 0.20 mm
(0.0043 ~ 0.0079 in)
Exhaust valve:
0.21 ~ 0.25 mm
(0.0083 ~ 0.0098 in)

Checking steps:
- Turn the crankshaft counterclockwise.
- When piston #1 is at TDC on the compression stroke, align the TDC mark ⓐ on the A.C. magneto rotor with the mark ⓑ on the A.C. magneto cover.

NOTE:
TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.

- Measure the valve clearance with a thickness gauge ①.

NOTE:
- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.

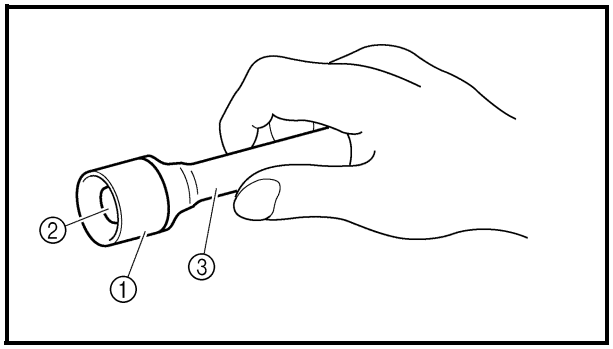
Valve clearance measuring sequence
Cylinder #1 → #2

- Turn the crankshaft 180° counterclockwise and check the valve clearance of piston #2.

A Front

5. Remove:
   - Intake camshaft
   - Exhaust camshaft

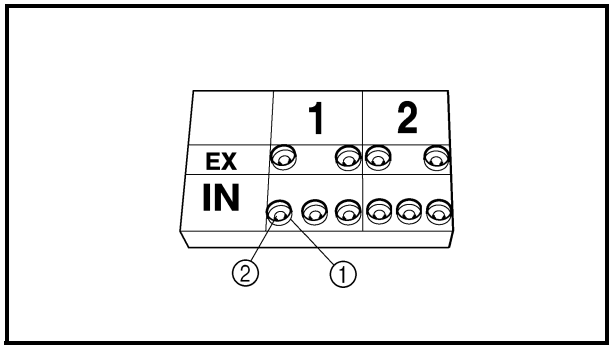
NOTE:
- Refer to “CAMSHAFTS” in CHAPTER 5.
- When removing the timing chain and camshafts, fasten a wire to the timing chain to retrieve it if it falls into the crankcase.



6. Adjust:
   - Valve clearance

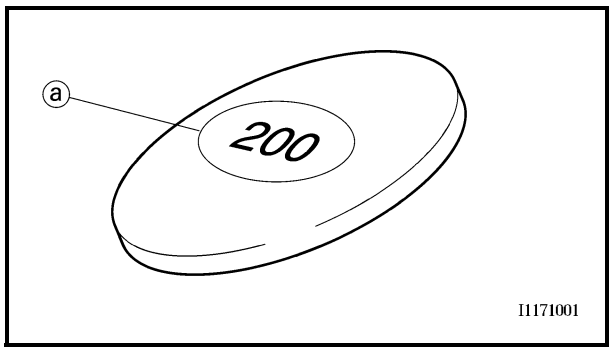
Adjustment steps:
- Remove the valve lifter ① and the valve pad ② with a valve lapper ③.

NOTE:
- Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.
- Make a note of the position of each valve lifter ① and valve pad ② so that they can be installed in the correct place.



- Select the proper valve pad from the following table.

Valve pad thickness range		Available valve pads
Nos. 120 ~ 240	1.20 ~ 2.40 mm (0.047 ~ 0.094 in)	25 thicknesses in 0.05 mm (0.0020 in) increments



NOTE:
- The thickness ⓐ of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter.
- Since valve pads of various sizes are originally installed, the valve pad number must be rounded in order to reach the closest equivalent to the original.

- Round off the original valve pad number according to the following table.

Last digit	Rounded value
0 or 2	0
5	5
8	10

EXAMPLE:

Original valve pad number = 148 (thickness = 1.48 mm (0.058 in))

Rounded value = 150

- Locate the rounded number of the original valve pad and the measured valve clearance in the valve pad selection table. The point where the column and row intersect is the new valve pad number.

NOTE:

The new valve pad number is only an approximation. The valve clearance must be measured again and the above steps should be repeated if the measurement is still incorrect.

VALVE PAD SELECTION TABLE

INTAKE

Measured clearance ↓	INSTALLED PAD NUMBER																										
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.00 ~ 0.02				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225		
0.03 ~ 0.07			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230		
0.08 ~ 0.10		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235		
0.11 ~ 0.20	Specification																										
0.21 ~ 0.25	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.26 ~ 0.30	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.31 ~ 0.35	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.36 ~ 0.40	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.41 ~ 0.45	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.46 ~ 0.50	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.51 ~ 0.55	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.56 ~ 0.60	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.61 ~ 0.65	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.66 ~ 0.70	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.71 ~ 0.75	175	180	185	190	195	200	205	210	215	220	225	230	235	240													
0.76 ~ 0.80	180	185	190	195	200	205	210	215	220	225	230	235	240														
0.81 ~ 0.85	185	190	195	200	205	210	215	220	225	230	235	240															
0.86 ~ 0.90	190	195	200	205	210	215	220	225	230	235	240																
0.91 ~ 0.95	195	200	205	210	215	220	225	230	235	240																	
0.96 ~ 1.00	200	205	210	215	220	225	230	235	240																		
1.01 ~ 1.05	205	210	215	220	225	230	235	240																			
1.06 ~ 1.10	210	215	220	225	230	235	240																				
1.11 ~ 1.15	215	220	225	230	235	240																					
1.16 ~ 1.20	220	225	230	235	240																						
1.21 ~ 1.25	225	230	235	240																							
1.26 ~ 1.30	230	235	240																								
1.31 ~ 1.35	235	240																									
1.36 ~ 1.40	240																										

exa → 0.26 ~ 0.30

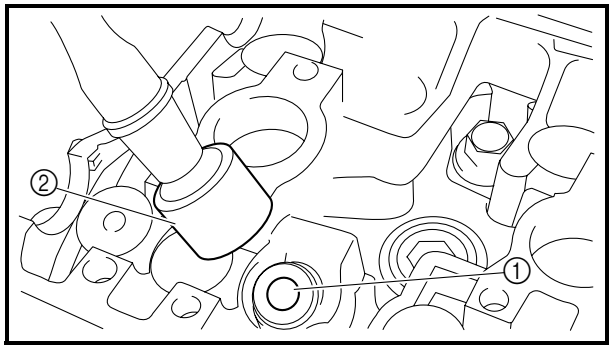
EXAMPLE:
VALVE CLEARANCE:
0.11 ~ 0.20 mm (0.0043 ~ 0.0079 in)
Installed is 175
Measured clearance is 0.27 mm (0.0106 in)
Replace 175 pad with 185 pad

EXHAUST

Measured clearance ↓	INSTALLED PAD NUMBER																										
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.00 ~ 0.02						120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215		
0.03 ~ 0.07					120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220		
0.08 ~ 0.12				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225		
0.13 ~ 0.17			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230		
0.18 ~ 0.20		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235		
0.21 ~ 0.25	Specification																										
0.26 ~ 0.30	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.31 ~ 0.35	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.36 ~ 0.40	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.41 ~ 0.45	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.46 ~ 0.50	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.51 ~ 0.55	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.56 ~ 0.60	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.61 ~ 0.65	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.66 ~ 0.70	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.71 ~ 0.75	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.76 ~ 0.80	175	180	185	190	195	200	205	210	215	220	225	230	235	240													
0.81 ~ 0.85	180	185	190	195	200	205	210	215	220	225	230	235	240														
0.86 ~ 0.90	185	190	195	200	205	210	215	220	225	230	235	240															
0.91 ~ 0.95	190	195	200	205	210	215	220	225	230	235	240																
0.96 ~ 1.00	195	200	205	210	215	220	225	230	235	240																	
1.01 ~ 1.05	200	205	210	215	220	225	230	235	240																		
1.06 ~ 1.10	205	210	215	220	225	230	235	240																			
1.11 ~ 1.15	210	215	220	225	230	235	240																				
1.16 ~ 1.20	215	220	225	230	235	240																					
1.21 ~ 1.25	220	225	230	235	240																						
1.26 ~ 1.30	225	230	235	240																							
1.31 ~ 1.35	230	235	240																								
1.36 ~ 1.40	235	240																									
1.41 ~ 1.45	240																										

exa → 0.31 ~ 0.35

EXAMPLE:
VALVE CLEARANCE:
0.21 ~ 0.25 mm (0.0083 ~ 0.0098 in)
Installed is 175
Measured clearance is 0.35 mm (0.0138 in)
Replace 175 pad with 185 pad



- Install the new valve pad ① and the valve lifter ②.

NOTE:

- Apply molybdenum disulfide oil to the valve pad and the valve lifter.
- The valve lifter must turn smoothly when rotated by hand.
- Install the valve lifter and the valve pad in the correct place.

- Install the exhaust and intake camshafts, timing chain and camshaft caps.

Camshaft cap bolt:
9 Nm (0.9 m · kg, 6.5 ft · lb)

NOTE:

- Refer to “CAMSHAFTS” in CHAPTER 5.
- Lubricate the camshaft caps, camshaft lobes, camshaft journals and camshaft cap bolts.
- Align the camshaft marks with the camshaft cap marks.
- Rotate the crankshaft counterclockwise several turns to seat the parts.

- Measure the valve clearance again.
- If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

7. Install:
   - Crankshaft end accessing screw
   - Timing mark accessing screw
8. Install:
   - Cylinder head cover
     Refer to “CAMSHAFTS” in CHAPTER 5.
9. Install:
   - All removed parts

NOTE:

For installation, reverse the removal procedure. Note the following points.